Claims

1. Method for controlling the power of electronically switched two-phase reluctance machines with direct transmission of the demagnetization energy of a switched-off phase to the following phase, characterized in that the switching-on of the main current (Ip) takes place delayed by a duration (t) after the phase commutation.

2. Method for power control according to claim 1, characterized in that, between the locking of the power switch (21X) of a phase (X) and the current conducting phase of the switch (21Y) of the following phase (Y), the self-induction voltage Ua, which arises by the switching-off of the phase (X) at the connection between the main winding (112X) and the power switch (21X), is supplied over a bypass diode (22) to a phase (Y, X, Y) which is not separated from the source of current.

3. Method for power control according to the claims 1-2, characterized in that the speed control and limitation takes place in that the delay (t) is independent from the number of revolutions.

4. Method for power control according to the claims 1-2, characterized in that the rise-delay time (t) of the main current depends on the number of revolutions and arises from the superposition of the complementary phase commutation signals with form similar signals which are phase-shifted with respect to the first ones by an angle (v) which is independent of the number of revolutions.

5. Method for power control according to the claims 1, 2 and 4, characterized in that the duty cycle of the power switches (21) of the phases (X, Y) is controlled over the phase difference of the output signals of two Hall sensors (31, 31a).

6. Method for power control according to the claims 1, 2 and 4, characterized in that the phase-shifted signals of two digital Hall sensors 31, 31a arise because the sensors are mechanically displaceable.

7. Method for power control according to the claims 1, 2 and 4, characterized in that the mechanical displacement of a Hall sensor (31) or the electrical phase

shifting of its output signal takes place depending on an output value such as pressure, flow, temperature, current, oscillation amplitude etc. which comes from a coupled working device.

8. Method for power control according to claim 7, characterized in that the displacement of the Hall sensor (31) or the electrical phase shifting of its output signal changes the operating mode of the machine from a motor to a generator function.

9. Method for power control according to the preceding claims, characterized in that the desired direction of rotation ensues over the presetting of a starting sensor (31) and the speed control takes place over the phase difference between the starting sensor (31) and a second sensor (31a), whereby the phase difference is changed by the manual displacement of these sensors (31, 31a) or by the electrical phase shifting of the output signals.

10. Method for power control according to the claims 1 to 4, characterized in that the rise-delay time (t) of the main current (Ip) takes place over an electronic time function element which is set into operation by the high/low transition of the phase control.

11. Method for power control according to the preceding claims, characterized in that the interruption of the main current within a phase is purposefully used to influence the current flow in this phase and in the following phase.

12. Method for power control according to the preceding claims, characterized in that a saw-tooth rotor position signal, used for the motor control, is gained by means of a profiled disk (32) which rotates in front of an analog Hall sensor (31c) polarized by the permanent magnet (33) which forms together with the latter a system of variable reluctance so that the output signal of the Hall sensor (31c) is a saw-tooth signal.

13. Method for power control according to claim 12, characterized in that from the saw-tooth signal of the Hall sensor (31c) variable rectangular control signals are gained in that the level of the saw-tooth signals is compared with the adjustable trigger level (Uk) of a trigger (34).

14. Method for power control according to the preceding claims, characterized in that it uses an automatic phase symmetry method, for which a signal (Ud), which is proportional to the difference of the phase duration of both phases, serves for the variation of the trigger level (Uk) of a trigger (34) which corrects the phase width.

15. Method for power control according to the preceding claims, characterized in that the control of the digital phase commutation is derived from the recognition of the phase position of an analog signal which can be phase-shifted if need be.

16. Method for power control according to the preceding claims, characterized in that the optimization of the phase commuation (efficiency) takes place by the automatic correction of the main current (Ip) and/or of the bypass current (Ib) as well as of the path of the self-induction voltage (Ua) in direction of the minimal values or of the power draw of the motor.

17. Method for power control according to the preceding claims, characterized in that the control functions of the machine are carried out by means of a programmable Hall sensor (38d).

18. Method for power control according to the preceding claims, characterized in that the control functions of the machine are carried out by means of a differential Hall sensor, this Hall sensor being directly triggered by the teeth (121) of the rotor (2).

19. Method for power control according to the preceding claims, characterized in that the phase commutation is adjusted depending on a current which traverses the windings (112, 113) by a current path which traverses the magnetic control circuit of the Hall sensor (31).

20. Method for power control according to the preceding claims for two-phase reluctance machines which consist of two angle-offset, independently operative machine halfs, characterized in that the bypass current (Ib) from the phases of a machine half is transmitted to the phases of the other machine half.

21. Method for power control according to the preceding claims, characterized in that the main current (Ip) is interrupted in any position (t2) within the phase duration for a short time (t3).

22. Method for power control according to the preceding claims, characterized in that the starting current limitation takes place by the interruption of the main current (Ip) when reaching an upper limit, whereby its switching-on again takes place after a short predetermined time or when a lower limit is reached.

23. Method for power control according to the preceding claims, characterized in that the unavoidable peaks of the self-induction voltage (Ua) are absorbed by Ua depending voltage controlled conducting phases of the power switches (21).

24. Method for power control according to the preceding claims, characterized in that the most important control and protective functions of the machine are carried out by the control of the power switches (21) for which their gate electrodes (Gx, Gy) are triggered as required over phase commutation, power control on/off, overvoltage and undervoltage protection, thermal switching-off, overcurrent and short-circuit as well as protection against inductive voltage peaks (Ua).

25. Method for power control according to the preceding claims for reluctance machines without stator with two independent rotors (1, 2), characterized in that their field rotor (1) carries the power electronics (21, 22) and a part of the power control which receives the control signals from outside contactless by means of an axially mounted Hall sensor (39) which is triggered by a stationary winding (49).

26. Method for power control according to claim 24, characterized in that the synchronization of the signals of the winding (49) takes place by the recognition of the form of the current and voltage paths in the connecting lines.

27. Method for power control according to claim 10, characterized in that the flip-flop signals of the phase control which have been obtained on the outputs (Hx, Hy) of the phase control (31) charge alternately capacitors (Cl) corresponding to each phase during the high phase, whereby phase synchronized time

decreasing voltage levels (Ur) arise due to their discharging during the following low phase in series with resistors (Rt), these voltage levels being referred to the phase beginning and being conducted to the input of a level detector (ST, Dr).

28. Method for power control according to the preceding claims, characterized in that from the phase commutation signals positive or negative fractions are separated from which, by integration by means of capacitors (Cv) or resistors (Pv) slowly variable analog voltage signals are obtained which can be adjusted as nominal value and which are proportional to the number of revolutions of the motor.

29. Method for power control according to the claims 27 and/or 28, characterized in that the phase synchronized voltage levels (Ul) are superposed with the analog voltage (Uv) over a resistor (Rv) which causes a ripple for adjusting the number of revolutions and are supplied to the level switch(es) (ST, Dr) in such a way that it thus controls the number of revolutions of the motor from the time of the phase commutation to the reaching of a sawtooth voltage (Uv) which determines the rise-delay (t) of the power switches (21).

30. Method for power control according to the preceding claims, characterized in that the electric potentials of the gate electrodes (Gx, Gy) of the power switches (21X, 21Y) can be switched „low" independently from each other by the phase control (31) and/or by a level discriminator (ST).

31. Method for power control according to the preceding claims, characterized in that respectively one driver component (Dr) is used per phase, the inputs (I) of which show respectively one level detector each and the outputs (0) of which switch the gate electrodes (Gx, Gy) of the power switches (21) alternately from „low" to „high" potential.

32. Method for power control according to the preceding claims, characterized in that analog signals depending on the number of revolutions are used as negative feedback for influencing the starting behaviour and the speed control of the motor.